CCS/MI 22 Attachment *of Staphylococcus epidermidis* RP62A to chemically modified cellulose derivatives

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Coagulase negative staphylococci, most notably *Staphylococcus epidermidis*, have been identified as a predominant cause of cardiovascular implant infection, which begins with the colonization of the device by the bacteria. One possible approach to reduce this event is to understand how the physicochemical properties of bacterial surface influence attachment to biomaterials.

In the present study, the attachment of coagulase negative *Staphylococcus epidermidis* expressing capsular polysaccharide/adhesin (PS/A), the most common etiological agent of colonization of implantable medical devices, was assessed *in vitro* to cellulose diacetate (CDA), to CDA chemically modified by de-acetylation (CDA-D) and by phosphorylation (CDA-P), as well as to reference Low Density Polyethylene (LDPE).

The quantification of *S. epidermidis* attached to cellulose diacetate (CDA) in phosphate buffer saline (PBS) elicited information regarding the interaction between the bacterial strain and the polymeric biomaterial. There was a significant difference in the adhesion of RP62A to CDA, compared to LDPE. Chemical modifications of CDA by de-acetylation and by phosphorylation were effective in lowering bacterial attachment. These chemical treatments increased the acidic parameter of the surface energy and decreased the acid-base interactions with acidic sites of the capsular PS/A. In other terms, these treatments also promoted a decrease in hydrophobicity that linearly correlates with a decrease in the number of attached cells.